THE INVENTION CLAIMED IS:

1. A radiation detector crystal made from a compound comprising:

$Cd_xZn_{1-x}Te$, where $0 \leq x \leq 1$;

an element from column III or column VII of the periodic table of the elements; and

the element Ruthenium (Ru), the element Osmium (Os) or a combination of Ru and Os.

2. A radiation detector crystal of claim 1, wherein the element from column III or column VII of the periodic table of the elements has a concentration between about 1 to 10,000 atomic parts per billion.

3. A radiation detector crystal of claim 2, wherein the element Ruthenium (Ru), the element Osmium (Os) or the combination of Ru and Os has a concentration between about 1 to 10,000 atomic parts per billion.

4. A radiation detector crystal of claim 1, wherein the element Ruthenium (Ru), the element Osmium (Os) or the combination of Ru and Os has a concentration between about 1 to 10,000 atomic parts per billion.

5. A radiation detection device comprising a crystal made from a combination of $Cd_xZn_{1-x}Te$, where $0 \leq x \leq 1$; an element from column III or column VII of the periodic table of the elements; and the element Ruthenium (Ru), the element Osmium (Os) or a combination of Ru and Os.

6. A method of forming a radiation detector crystal comprising:

(a) providing a melt comprised of:

(1) a mixture of $Cd_xZn_{1-x}Te$, where $0 \leq x \leq 1$,

(2) a first dopant that adds shallow level donors (electrons) to the top of an energy band gap of said mixture when it is solidified, and

(3) a second dopant that adds deep level donors and/or acceptors to the middle of said energy band gap of said mixture when it is solidified,

wherein the second dopant is one of the elements of Ruthenium (Ru) and Osmium (Os); and

(b) solidifying said melt in a manner to form the crystal.

7. The method of claim 6, wherein a concentration of the element Ru or Os is between about 1 to 10,000 atomic parts per billion.

8. The method of claim 6, wherein the melt further includes a third dopant that adds deep level donors and/or acceptors to the middle of said energy band gap of said mixture when it is solidified, wherein the third dopant is the other one of the elements of Ruthenium (Ru) and Osmium (Os).

9. The method of claim 6, wherein the first dopant is an element from column III or column VII of the periodic table of the elements.

10. The method of claim 9, wherein the first dopant is an element selected from the group consisting of B, Al, Ga, In, Tl, F, Cl, Br and I.

11. The method of claim 6, wherein a concentration of the first dopant in the compound is between about 1 to 10,000 atomic parts per billion.

12. The method of claim 8, wherein a concentration of the element Ru, the element Os or the combination of the elements Ru and Os in the compound is between about 1 to 10,000 atomic parts per billion.

13. The method of claim 6, the crystal is formed by way of the Bridgman method, the gradient freeze method, the electro-dynamic gradient freeze method, the traveling heater method or by the vapor phase transport method.

14. The method of claim 13, wherein at least one of step (a) and step (b) is performed in the presence of a gas.

15. The method of claim 14, wherein the gas is at least one of Nitrogen (N), Helium (He), Neon (Ne), Argon (Ar), Krypton (Kr), Xenon (Xe), Hydrogen (H) and Deuterium (D).